

N. I. Lobachevskiy and Mechanics

SOV/55-58-6-11/31

(8, T. II pp 158-159). Several similar quotations from this work are given. He was the first to define space by the real properties of physical bodies, and he connected time with motion in space. He wrote: "The duration of the motion of a body in space is called time". The causes of motion, the "forces", are identical with present-day "impulses". About the attraction and repulsion of bodies he wrote, "when two bodies approach each other, they at the same time attract and repulse each other". In his lectures, he dealt in detail with the addition of forces. An outline of what he said in this respect is given. In his work on "The Projection Theory of Vectors" he raised the question as to whether the simple way of dealing with the problem with the parallelograms of forces in Euclidian space is sufficient in order to be able to describe the addition of forces and motions. There are 24 references, 10 of which are Soviet.

ASSOCIATION: Kafedra obshchey fiziki (Chair for General Physics)

SUBMITTED: February 26, 1958
Card 2/2

VERKHUNOV, V.M.

N.I. Lobachevskii and mechanics. Vest.Mosk.un.Ser.mat., mekh., astron.,
fiz., khim. 13 no.6:77-89 '58. (MIRA 12:4)

1. Kafedra obshchey fiziki Moskovskogo gosudarstvennogo universiteta.
(Lobachevskii, Nikolai Ivanovich, 1793-1856)
(Mechanics)

VERKHUSHKIN, Vladimir Alekseyevich; SMIRNOV, V.A., red.; BRUSSETYN, A.I.,
red.izd-va; EVENSON, I.M., tekhn.red.

[Technical norms for manufacturing metalware] Tekhnicheskoe
normirovanie metiznogo proizvodstva. Moskva, Gos.nauchno-tekhn.
izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 141 p.
(MIRA 14:3)

(Metalwork)

SEMENOVSKAYA, E. N. and VERKHUTINA, A. I."

"Age-Linked Changes in the Functional Mobility (Lability) of the Visual Analyser."

Problemy Fiziologicheskoi optiki 7: 34-38, 1949.

Trans: NIH

VERKHUTINA, A. I. Cand. Biolog. Sci.

Dissertation: "The Electrical Sensitivity of the Eye and Variations in it
Due to Age, Time of Day and Certain Other Factors." Inst of Neurology,
Acad Med Sci USSR, 14 Feb 47.

SO: Vechernyaya Moskva, Feb, 1947 (Project #17836)

VERKHUTINA, A. I.

24302 VERKHUTINA, A. I. Rozrastnyye izmeneniya funktsional'noy podvizhnosti
(Labil'nosti) zritel'nogo analizatora. Problemy fiziol. Optiki, I, VII,
1949, S. 34-38. - Bibliogr: 7 nazv.

SO: Letopis, No. 32, 1949.

8(6), 14(6)

AUTHORS:

SOV/143-58-11-10/16
Gokhsteyn, D.P., Doctor of Technical Sciences, Professor, Verkhivker, G.P., Engineer, Gorodetskiy, A.E., Engineer

TITLE:

The Problem of Expanding Existing Power Plants

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy, Energetika, 1958, Nr 11, pp 71-78 (USSR)

ABSTRACT:

The rapid increase of installed capacities in thermal power plants during the sixth Five-Year Plan and during the following years necessitates an expansion of the existing high and medium pressure power plants. In addition the construction of new power plants with increased and super-high steam pressures is required. Steam superimposing (parovaya nadstroyka) and gas turbine extension (gazoturbinnaya pristroyka) may be used for expanding existing thermal power plants. Under "steam superimposing" the authors understand an additional cycle connected to the basic operation cycle of a thermal power plant. The waste heat of this additional cycle is used for obtaining superheated, or,

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dry, saturated steam. It is assumed that the superheating of steam for the installation to be superimposed is achieved by the heat of the fuel. The "gas turbine extension" means the connection of an additional cycle during which a considerable amount of the heat, used for obtaining dry, saturated steam, and the heat, required for superheating, are provided by the fuel. Figures 1 to 3 are graphic representations of these additional cycles. These diagrams show that any steam superimposing leads to an efficiency increase which is also confirmed by three equations which are used for determining η . The power limitation of gas turbine will create some difficulties when combining the latter with steam turbines. The authors then investigate in somewhat more detail various possible power plant reconstruction systems taking into consideration locally available fuel. In case only solid fuels are available, steam superimposing or gas turbine extension with a closed cycle may be used. The authors consider the reconstruction of two turbine

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types: VK-100-2 (90 atmospheres, 480°C) and AK-50 (29 atmospheres, 400°C). By comparison and thermodynamic analysis the authors arrive at the conclusion that an initial steam pressure increase above 300-350 atmospheres will not provide a noticeable fuel saving. In this connection, the upper steam superimposing parameters are indicated with 300 atmospheres and 650°C, corresponding to the initial parameters of the SKK-300 turbine. Considerable results are achieved when superimposing the 29 atmosphere unit, since here, intermediate superheating and a feed water temperature increases to 280-300°C may be used. The gas turbine extension is justified only in case the cost per installed kilowatt is lower than that of steam superimposing, i.e. when the excess in fuel consumption is justified by lower amortization costs. The authors then consider power plants at which gas and coal are available as fuels. In this case, beside the steam superimposing an open-cycle gas turbine may be used, using the arrangement shown in figure 7. Such a gas

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turbine cycle was suggested by Professor Ya.I. Shnee and Engineer A.A. ~~Kasatkin~~ /Ref 17. With this system, it is possible using solid fuel in the steam boiler. The efficiency of such a combine unit with a VK-100-2 turbine is 36.7% at a superimposing power of 58,000 kilowatts. For reducing the heater surface and increasing the possible unit power of the gas turbine, a semi-closed cycle may be suggested, as shown in figure 8. The power of such unit will amount to 40,700 kilowatts, having a somewhat lower efficiency (35.6%) than the aforementioned unit. However, the regenerator and water-gas heater surfaces are reduced by 30-40%. The gas turbine plant consists of one main turbine and auxiliary gas turbines, driving axial compressors and electric generators. Finally, the authors consider power plants using only liquid or gaseous fuels. In this case the open cycle gas turbine unit may be used which will be more economical when using a VK-100-2 turbine than the steam superimposing with steam parameters of 300 atmospheres and

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650°C. The efficiency of such a system, working on natural gas (8533 Cal) with an initial gas temperature of 700°C, is 38.3% with the VK-100-2 turbine and 34.8% with the AK-50 turbine. The authors compared the various possible superimposing and extension systems. This comparison is shown in table 1. The authors arrive at the following conclusions: 1) From the thermodynamic viewpoint, only such a gas turbine extension will be more effective at which the internal regeneration of the gas cycle is highly developed. 2) In a number of cases, a gas turbine extension will be more profitable than steam superimposing of existing power plants, provided liquid or gaseous fuel is available. This peculiarity is especially obvious when superimposing power plants with initial steam parameters of 90 atmospheres and 480°C. 3) The lower the parameters of the steam section of the existing power plant, the relatively higher the superimposing of such power plants will be. The efficiency of superimposed power plants having lower steam parameters will exceed in

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some cases also by absolute values the efficiency of superimposed plants with higher steam parameters.
4) Using semi-closed gas turbine cycles for superimposing facilitates a considerable reduction of the heater surfaces and dimensions of units with a small reduction of the profitableness. There are 2 diagrams, 6 graphs, 1 table and 2 Soviet references.

ASSOCIATION: Odesskiy tekhnologicheskii institut imeni I.V. Stalina
(Odessa Institute of Technology imeni I.V. Stalin)
Kafedra obshchey teplotekhniki (Chair of General Heat Engineering)

SUBMITTED: June 24, 1958

Card 6/6

VERKIN, A.

Without respect of persons. Okh.truda i sots.strakh. no.1:35-36
Ja '60. (MIRA 13:5)

1. Starshiy inzhener po tekhnike bezopasnosti zavoda elektro-
schetchikov, g.Vil'nyus.
(Works councils)

ACC NR: AP5025259 IJP(c) JD/WH SOURCE CODE: UR/0386/65/002/004/0186/0189
 AUTHOR: Chekin, V. V.; Romanov, V. P.; Verkin, B. I.; Bokov, V. A.
 ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences USSR
 (Fiziko-tekhnicheskiy institut nizkikh temperature Akademii nauk USSR)
 TITLE: Change in the probability of the Mossbauer effect on Sn^{119} impurity nuclei in the ferroelectric phase transition in BaTiO_3
 SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 4, 1965, 186-189
 TOPIC TAGS: Mossbauer effect, ferroelectric effect, phase transition, barium titanate, impurity center, tin containing alloy.
 ABSTRACT: This is a continuation of earlier work (FTT v. 7, 1965), where it was assumed that the phase transition in solid solutions of the $\text{Ba}(\text{Ti}_{0.9}\text{Sn}_{0.1})\text{O}_3$ system is considerably spread out. In the present study, the authors have investigated the probability of the Mossbauer effect on Sn^{119} impurity nuclei in the $\text{Ba}(\text{Ti}_{0.99}\text{Sn}_{0.01})\text{O}_3$ system near the ferroelectric phase-transition temperature. The introduction of so small an amount of tin impurity into barium titanate does not change its ferroelectric properties noticeably, but at the same time makes it possible to measure the resonance absorption of 23.8-keV γ quanta by the Sn^{119} impurity nuclei. The samples were prepared by standard ceramic technology, using tin oxide enriched with Sn^{119} to 65.1%. The measurements were made with a setup in which the absorber was driven at constant

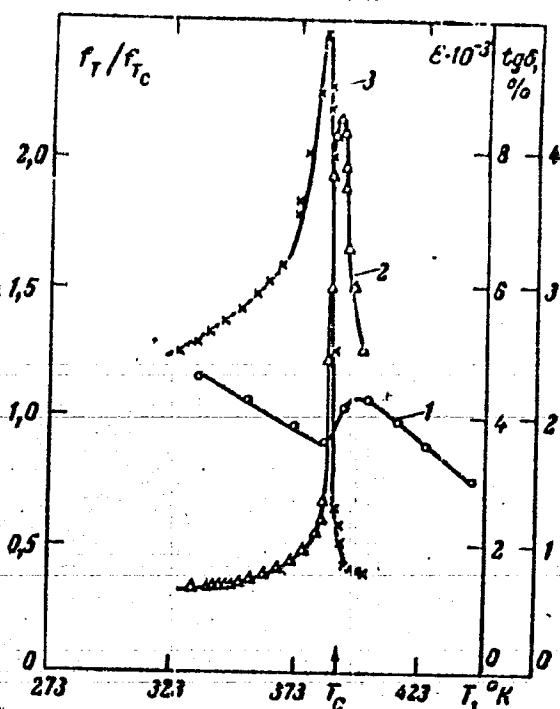
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ACC NR: AP5025259

Fig. 1. Temperature dependence of the relative Mossbauer effect probability (1), dielectric constant (2), and dielectric loss tangent for the system $\text{Ba}(\text{Ti}_{0.99}\text{Sn}_{0.01})\text{O}_3$.



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ACC NR: AP5025259

speed by means of a mechanical cam drive. The γ -quantum source was magnesium stannide $\sim 18 \text{ mg/cm}^2$ thick. Measurements were made of the temperature dependence of the relative Mossbauer-effect probability (1), of the dielectric constant (2), and of the dielectric loss tangent (3) for the system $\text{Ba}(\text{Ti}_{0.99}\text{Sn}_{0.01})\text{O}_3$ (Fig. 1). The relative probability of the effect was determined from the ratio of the areas of the absorption spectra at the given temperature to the area of the spectrum at the Curie temperature, the value of which ($T_C = 390\text{K}$) was chosen to correspond to the maximum of the dielectric constant. It is seen from the figure that the relative Mossbauer-effect probability decreases quite sharply on approaching the Curie point from the paraelectric region, passes through a minimum, and then begins to grow with decrease in temperature in the usual manner. This singularity can be attributed to the temperature dependence of the frequency of the anomalous optical branch. A comparison of the results with earlier measurements (Bokov, Romanov, and Chekin, FTT v. 7, 1886, 1965) confirms the previously advanced hypothesis that the phase transition in solid solutions of the $\text{Ba}(\text{Ti}_{0.8}\text{Sn}_{0.2})\text{O}_3$ system is considerably "smeared." Authors thank Professor G. A. Smolenskiy for continuous interest in the work, Candidate of Technical Sciences I. E. Myl'nikov for preparing the samples, and L. I. Kazakevich for help with the measurements. Orig. art. has: 1 figure.

SUB CODE: SS/ SURV DATE: 21Jun65/ ORIG REF: 005/ OTH REF: 002

nw

Card 3/3

67

Some optical investigation of superconductors. B. I. Verkin and B. G. Lazarev. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 12, 608-600(1948).—Since superconductors behave like normal metals at frequencies smaller than 10^{10} cycles ($\lambda = 1 \text{ mm.}$), it was presumed that a min. quantum energy with $\nu_{\text{min}} \approx 10^{11}$ cycles is necessary to excite the metal and that in light reflected or transmitted through a thin film of a superconductor a second line should appear besides the original line and displaced by $\Delta\lambda = 0.7 \lambda^2 \nu_{\text{min}}$ cm. Monocrystals of Hg and Sn were grown in glass tubes with flat glass windows. After removal of the window good specularly reflecting surfaces were obtained. By placing the samples at 1.7°K. between the poles of an electromagnet they could be made superconductive. Neither the frequency as measured with a Fabry-Perot interferometer nor the intensity of the reflected or transmitted light showed any modification during the transition from one state into the other. S. Pakswier

VERKIN, B. I.

PA 173T98

USSR/Physics - Low Temperatures 21 Dec 49

"Magnetic Properties of Tin at Low Temperatures," B. I. Verkin, B. G. Lazarev, N. S. Rudenko, Physicotech Inst, Acad Sci USSR, Kharkov

"Dok Ak Nauk SSSR" Vol LXIX, No 6, pp 773-776

Subject studies at temp of liquid hydrogen and helium show presence in tin of strongly expressed DeHaas-Van Alphen effects, studied by measuring force-couple of crystal in magnetic field up to 12,000 oersteds. Submitted 31 Oct 49 by S. I. Vavilov.

173T98

CA

Chemistry - 62

Periodic dependence of the magnetic susceptibility of metals on the field at low temperatures. B. I. Verkin, B. G. Lazarev, and N. S. Rudenko (Phys.-Tech. Inst., Acad. Sci. Ukr. S.S.R., Kiev). *Zhur. Eksp. Teor. Fiz.* 29, 931-4 (1955); cf. C.A. 49, 93184. — The Schubnikow-de Haas and the de Haas-van Alphen effects exist in many

metals other than Bi. By measurements of the couple acting on a crystal suspended in a magnetic field, the de Haas-van Alphen effect was found in Zn at liquid-H₂ temp. and in Sn. Periodic variation of the magnetic susceptibility with the magnetic field was further observed in Be at 30.4°K. and much more strongly at liquid-He temp.; in Ni and cerium, the oscillation period of the susceptibilities difference attains 180 oersteds, and 1000 in a 12,000-oersted field. In Mg, the effect is observable at 4.2°K. and increases with further decreasing temp.; the oscillation period, in 10,000- and 14,000-oersted fields, is 140 and 180, resp. With In, the effect becomes observable at about 2°K. in 12,000 oersteds. With Cd, at 2°K., the oscillation period in 12,000 and 14,000 oersteds is 25 and 40, resp. N. Thou

PERKIN, B. I.

USSR/Physics - Viscosity
Nitrogen

Jun 50

"Temperature Dependence of Viscosity of Liquefied Nitrogen and Argon for Constant Density," B. I. Perkin, N. S. Rudenko, Physicotech Inst, Acad Sci Ukrainian SSR

"Zhur Eksper 1 Teoret Fiz" Vol XX, No 6, pp 523-526

Viscosimeter for measuring viscosity of liquids and gases at constant density for wide range of temperatures has been developed and constructed. Measures viscosity of N₂ and Ar between solidification point

163T90

USSR/Physics - Viscosity (Contd)

Jun 50

and 300° K. Establishes complex relation between their viscosities and temperature for constant density. Submitted 26 Dec 49.

163T90

VERKIN, B. I.

USSR/Physics - Low Temperatures Nov 50

"Magnetic Properties of Metals at Low Temperatures: I. The Periodic Variation of Cd, Be, Mg, Sn in Monocrystals" Magnetic Susceptibility in Dependence Upon the Magnetic Field Strength," B. I. Verkin, B. G. Lazarev, N. S. Rudenko, Physicotech Inst, Acad Sci Ukrainian SSR

"Zhur Ekspier i Teoret Fiz" Vol XX, No 11, pp 995-1010

Susceptibility varies periodically with field strength at low temperatures, differing for

1697102

USSR/Physics - Low Temperatures Nov 50
(Contd)

different subject metals. This effect can be characterized by definite parameters, differing for various metals, which correspond to peculiarities of crystalline structure. Submitted 30 Mar 50.

1697102

166798

USSR/Physics - Crystals
Magnetic Properties
1 Jul 50

"Crystallographic Anisotropy of the de Haas-van Alphen Effect," B. I. Verkin, B. G. Lazarev, N. S. Rudenko, Physicotech Inst, Acad Sci U'nion-Soviet, Khar'kov

"Dok Ak Nauk SSSR" Vol LXXII, No 1, pp 59-62

Studied anisotropy of magnetic properties in base plane of Zn and Be monocrystals at low temperatures of liquid H and He in field of 3,000 to 14,500 oersteds. Established new properties of de Haas-van Alphen Effect in these metals. Graphs show couple acting on

166798

USSR/Physics - Crystals (Contd) 1 Jul 50

monocrystal versus angle between field vector and one of binary axes of crystal. Submitted 3 May 50 by Acad S. I. Vavilov

166798

VERKIN, B. I.

Magnetic properties of antimony at low temperatures
B. I. Verkin, B. G. Lazarev, and N. S. Rudenko (Phys

Tech. Inst. Acad. Sci. Ukr. S.S.R., Kharkov). *Zhur. Eksp. Teor. Fiz.* 21, 658-9 (1951); cf. C.A. 45, 9318d.—
In single crystals of Sb, suspended with the 3rd-order symmetry axis perpendicular to the suspension axis, and one of the binary axes along the suspension, periodic variation of $\Delta\chi = \chi_{\parallel} - \chi_{\perp}$ (difference of magnetic susceptibilities parallel and perpendicular to the trigonal axis) with the magnetic field H (measured by the couple acting on the suspended crystal in a homogeneous magnetic field, forming an angle φ with the 3rd-order symmetry axis in the horizontal plane) manifests itself only weakly at 1.2°K., but is distinct at 2.01°K.: at $\varphi = 31^\circ$, the effect begins to appear at $H \sim 9,500$ oersteds, and the amplitude of the oscillations increases with H , becoming 150 oersteds at $H = 11,000$, and 250 oersteds at $H = 13,000$. At const $H = 13,400$, the oscillations of the couple are large around $\varphi = 45^\circ$, and diminish towards $\varphi = 0^\circ$ and 90° . Shoenberg's (C.A. 44, 8163g) repeated failure to detect the effect in Sb at 1.4°K. could be due either to insufficient H or to too large intervals.

N. Thon

VERKIN, B. I.

USSR/Physics - Low-Temperature Studies 1 Sep 51

"Magnetic Properties of Mercury at Low Temperatures," B. I. Verkin, B. G. Lazarev, N. S. Rudenko, Phys-Tech Inst, Acad Sci Ukrainian SSR, Khar'kov

"Dok Ak Nauk SSSR" Vol LXXX, No 1, pp 35, 46

Discusses the periodic character of the dependence of the difference of the main specific susceptibilities of Hg monocrystals upon the external field strength H for various low temps. States that foreign authors have failed to note this periodicity in their expts despite their attaining low enough temps, and high field strengths. Submitted 21 Jun 51 by Acad M. A. Leontovich. 221T84

"APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859510017-4

APPROVED FOR RELEASE: 09/01/2001

CIA-RDP86-00513R001859510017-4"

USSR/Physics - Low Temperature Research 1 Dec 51

"Certain Peculiarities of the Magnetic Properties of Zinc Monocrystals at Low Temperatures," B. I. Verkin, Phys-Tech Inst, Acad Sci Ukrainian SSR

"Dok Ak Nauk SSSR" Vol LXXI, No 4, pp 529-532

Verkin's purpose is to investigate the difference in the main sp susceptibilities of Zn monocrystals in the region of temps from 1.8°K to 20.4°K and in the interval of fields from 1,500 to 15,000 oersteds. Method of investigation used was that described by B. I. Verkin, V. G. Lazarev, and N. S. Rudenko "Zhur Eksper i Teoret Fiz" 20, 995, 202R87

USSR/Physics - Low Temperature Research (Contd) 1 Dec 51

1950. Shows graphs of: angular dependence of force couple acting on Zn crystals in uniform field H=4,000 oersteds at T=4.2°K; dependence of difference of main susceptibility on H for various T, etc. Submitted by Acad M. A. Leontovich 3 Oct 51.

202R87

VERKIN, B. I.

VERKIN, B.I.; MIKHAYLOV, I.P.

Magnetic properties of metals at low temperatures. Part 2. Effect of a magnetic field on the magnetic susceptibility of zinc single crystals in the temperature range from 20.4° to 300° K. Zhur.eksp. i teor.fiz. 24 no.3:342-346 Mr '53. (MIRA 7:10)
(Zinc--Magnetic properties) (Metallography)

VERVIN R.L.

USSR

1

1955-1956

Page 1

VERKIN, B.I.; DMITRENKO, I.M.

Anisotropy of magnetic properties of monocrystals of zinc at low temperatures. Izv.AN SSSR.Ser.fiz.19 no.4:409-428 J1-Ag '55.
(MIRA 9:1)

1.Fiziko-tehnicheskii institut Akademii nauk USSR.
(Metals at low temperatures)

VERKIN, B.I.; MIL'NER, A.S.; ROZENTSVEYG, L.N.; FAYNBERG, Ya.B.; KHOTKEVICH,
V.I.; SHKLYAREVSKIY, I.N.

Sections of Experimental, Theoretical, and General Physics at the
Department of Physics and Mathematics, 1930-1955. Uch.sop.KHOU
60:63-79 '55. (MIRA 10:1)

(Kharkov University--History)
(Physics)

VERKIN, B.I.

USSR/ Physics

Card 1/1 Pub. 22 - 10/54

Authors : Verkin, B. I.; Dmitrenko, I. M.; and Mikhaylov, I. F.

Title : Fine structure of the " phenomenon of a complex periodical dependence of the magnetic susceptibility of metals upon the field at low temperatures

Periodical : Dok. Ak. SSSR 101/2, 233-236, Mar 11, 1955

Abstract : The magnetic properties of Mg, Zn and Be monocrystals were investigated at an interval of 1500 to 20000 oersteds and temperature of $\leq 4.2^\circ \text{K}$ for the purpose of finding a simple interpretation for the "structure" of the phenomenon of a complex periodical dependence of the magnetic susceptibility of metals upon the magnetic field at low temperatures. The results obtained are discussed. Eight references: 2 English and 6 USSR (1938-1954). Graphs.

Institution : Academy of Sciences, Ukr SSR, Physico-Technical Institute

Presented by: Academician L. D. Landau, October 2, 1954

VERKIN, B. I., LAZAREV, G. B., DMITRENKO, I. M. and MIKHAYLOV, I. F. (Khar'kov)

"Magnetic Properties of Non-Ferromagnetic Metals at Low Temperatures,"
paper presented at the International Conference on Physics of Magnetic Phenomena,"
Sverdlovsk, USSR, 23-31 May 1956.

VERKIN, B.I.

Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization E-7

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3932

Author : Aleksandrov, B.N., Verkin, B.I., Lazarev, B.G.

Inst : Physicotechnical Institute, Academy of Sciences Ukrainian SSR

Title : Obtaining Pure Metals by the Zone Crystallization Method. I. Obtaining Pure Tin.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 1, 93-99

Abstract : The purity of the initial and recrystallized tin is characterized by the relative value of the residual electric resistivity $\delta = R_{h,2}/R_T$, where $R_{h,2}$ is the resistance of the investigated specimens of tin at the boiling point of liquid helium under normal pressure conditions, and R_T is the resistance of the same specimen at room temperature. When measuring the residual resistance of individual "samples", the specimens were prepared in the form of thin wires (0.1 mm in diameter) obtained by melting a piece of metal in a glass capillary tube and stretching it into a thread. The wires were annealed at 120 -- 140° for one hour. Curves are given for the dependence of the residual resistance of tin in the initial and final

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Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization E-7

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3932

portion of the ingot on the number of the recrystallizations. Eight to ten recrystallizations are enough to complete the tin-purification process. It can be seen from a graph showing the distribution of the impurities along the ingot after tin recrystallization, that in half the length of the ingot the impurity concentration is at a minimum and is constant. The impurities are concentrated at the end of the specimen (approximately 0.25 of the length of the ingot). From the scheme of the fractional multiple zone crystallization it can be seen that commercial tin contains impurities with $K \ll 1$ and $K > 1$ (K is the coefficient of impurity distribution, $K = C_{\text{solid}} / C_{\text{imp}}^{19}$; C is the concentration).

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VERKIN, B.I.

Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization E-7

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3933

Author : Aleksandrov, B.N., Verkin, B.I., Lazarev, B.G.

Title : Obtaining Pure Metals by the Zone Crystallization Method.II. Obtaining Pure Tin by a Combination of the Zone Crystallization Method with Purification of Metal from Volatile Impurities by Prolonged Heating in High Vacuum.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 1, 100-104

Abstract : High temperature heating of tin in vacuum reduces noticeably the contents of impurities with $K > 1$, and further multiple zone crystallization guarantees a more effective removal of the impurities of this kind remaining in the ingot. The use of fractionized multiple zone crystallization for the purification of chemically pure tin with initial value of $\delta = (1.4 \text{ -- } 1.6) \times 10^{-3}$ has made it possible to obtain a metal with $\delta = 2.7 \times 10^{-4}$. A subsequent 10-hour heating of this metal at 1000° and a pressure of 10^{-6} mm mercury reduced the residual resistance to $(2.0 \text{ -- } 2.1) \times 10^{-4}$.

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VERKIN, B. I.

USSR/ Physical Chemistry _ Liquids and amorphous bodies. Gases

B-6

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11069

Author : Bagrov N.N., Verkin B.I., Dolgoplov D.G.

Title : Determination of Diffusion Coefficient in Liquid by the Method of Saturation from Gaseous Phase

Orig Pub : Zh. fiz. khimii, 1956, 30, No 2, 476-478

Abstract : Description of the method of determining diffusion coefficient in liquid by saturating it with vapor of another substance. There are proposed the formulas:

$$\Delta Q/Q = c_0 (m/M) [1 - \frac{4}{\pi^2} \exp(-\frac{\pi^2 D t}{l^2})] \quad (1)$$

$$\Delta Q/Q = 4c_0 (m/M) \left\{ \frac{1}{\pi} \sqrt{\frac{D t}{l^2}} \left[\frac{1}{2} - \frac{1}{4} \left(\frac{l^2}{D t} \right) + \frac{1}{8} \left(\frac{l^4}{D^2 t^2} \right) - \dots \right] \right\} \quad (2)$$

wherein $\Delta Q/Q$ is the relative increase in weight of the liquid as a result of diffusion, D --diffusion coefficient, c_0 --concentration of the saturated solution of vapor in liquid, l --depth of the liquid layer, M and m --mass of the atoms of solvent and solute, t --time. Formula (1) relates to the instance $\pi D t > l^2$ (long duration of experiment or shallow depth of liquid layer), formula (2) to the instance $\pi D t < l^2$. The method consists in plotting the experimental curve $\Delta Q/Q = f(l/l)$, determining the tangent

Card 1/2

VERKIN, Boris Iyeremiyeovich (Physical-Tech Inst, As, UkSSR) awarded sci degree of Doc Physical-Math Sci for 21 Jun 57 defense of dissertation: "Magnetic properties of metals at low temperatures and the problem of the energy spectrum of electrons in metals" at the Council, Khar'kov State Univ imeni Gor'ki; Prot No 9P, 15 Feb 58.

(BIAVO, 6-58,20)

PA - 2077

AUTHOR:
TITLE:

VERKIN, B.I.

On the Temperature Dependence of the Magnetic Susceptibility of Elements. (K voprosu temperaturnoj zavisimosti magnitnoj bos-priimchivosti elementov, Russian). Zhurnal Eksperimental'noi i Teoret.Fiziki, 1957, Vol 32, Nr 1, pp 156-157 (U.S.S.R.)

PERIODICAL:

Reviewed: 4 / 1957

ABSTRACT:

The experimentally investigated magnetization of a substance is composed of the diamagnetism and the paramagnetism of the atomic trunk as well as of the paramagnetism of free charge carriers (e.g. of the conductivity electrons in the case of metals). For the susceptibility of elements the following formula then applies:

$$\chi_{\text{exp}} = \chi_{\text{ion}}^- + \chi_{\text{ion}}^+ + \chi_{\text{electr}}^- + \chi_{\text{electr}}^+$$

denote the contributions made by diamagnetism and paramagnetism respectively to the measured susceptibility. The classification of magnetica hitherto accepted is based on the consideration of the signs of the susceptibility experimentally measured. On the strength of the experimental data obtained for the temperature dependence of the susceptibility of elements another classification of magnetica can be suggested which is based on consideration of the character of the temperature dependence of susceptibility in weak magnetic fields. Four groups

Card 1/3

PA - 2077

On the Temperature Dependence of the Magnetic Susceptibility of Elements.

of elements are here concerned: 1) A paramagnetism which is practically temperature-dependent (alkali and alkaline earth metals), 2) A temperature-dependent paramagnetism (rare earths, transition elements), 3) A temperature-dependent diamagnetism (Be, Mg, Zn, Cd, Hg, Al, Ga, In, Tl, C, Sn, Pb, As, Sb, Bi), 4) A diamagnetism independent of temperature (noble gases etc.). Mostly the character of the temperature dependence of susceptibility in each group is determined by the predominance of one of the components in the formula given above. Thus e.g. the practically temperature-independent paramagnetism is characterized by the predominance of the paramagnetic contribution made by conductivity electrons. Special attention has to be paid to the fact that the elements of the aforementioned 4 groups take up a line in the so-called long periodical system of elements. In all metals of the third group the HAAS-VAN ALFVEN effect was observed at low temperatures. At $T \ll T_0$ and at $T \gg T_0$ the existing theory describes qualitatively the character of the temperature dependence of the metals of the third group. Here T_0 denotes the degeneration temperature of a group with small⁰ amount (of electrons?).

Card 2/3

PA - 2077

On the Temperature Dependence of the Magnetic Susceptibility
of Elements.

A systematical investigation of the temperature dependence of
the magnetic susceptibility of the metals of the third group
offers a further experimental possibility for the study of the
energy spectrum of electrons in metals.

ASSOCIATION: Physical-Technical Institute of the Academy of Sciences of
the Ukrainian SSR

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

Card 3/3

VERKIN, E. I.

AUTHOR

DMITRENKO, I.M., VERKIN, B.I., LAZAREV, B.G. 56-7-53/66

TITLE

The Influence Exercised by Pressure from all Sides upon the Magnetic Properties of a Zinc Monocrystal at low Temperatures.

(Vliyeniye vsestoronnego uzhatiya na magnitnyye svoystva monokristallov tsinka pri nizkikh temperaturakh).

PERIODICAL

Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 7. pp 287-289 (USSR)

ABSTRACT

At a temperature $T = 4,2^{\circ}\text{K}$ of a magnetic field $H = 8400 \text{ Oe}$ a self made zinc monocrystal was once exposed to a pressure of $P \sim 1500 \text{ kg/cm}^2$ which pressure was then lifted. These conditions prevailing the curves for the angular dependence of the moment L_x , which acts upon the crystal, and the dependence

$\Delta\chi(1/H)$ for $\theta 20$ and 80° are given.

(With 2 Illustrations and 5 Slavic references)

ASSOCIATION:

Physical-Technical Institute of the Ukrainian Academy of Sciences. (Fiziko-tehnicheskii institut Akademii nauk Ukrainiskoy SSR.)

PRESENTED BY:

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SUBMITTED:

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AVAILABLE:

Library of Congress.

Card 1/1

SOV/137-59-12-26631

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 12, p 124 (USSR)

AUTHORS: Aleksandrov, B.N., Verkin, B.I., Lazarev, B.G.

TITLE: Preparation of Pure Metals by the Method of Multiple Zonal-Recrystallization and the Use of Radioactive Isotopes to Investigate the Mechanism of Purifying the Metal From Admixtures by the Indicated Method

PERIODICAL: Tr. Sessii AS UkrSSR po mirn. ispol'zovaniyu atomn. energii, Kiyev, AS UkrSSR, 1958, pp 119 - 137

ABSTRACT: The authors analyze the methods of metal purifying by recrystallization, and the equipment for multiple zonal melting developed at FTI of AS UkrSSR; they discuss results obtained by investigating the mechanism of the process (distribution of the admixture over the zone, non-stability of the process, and deviations from the equilibrium) with the use of radioactive isotopes (Sn^{113} , Zn^{65} , Ag^{110} , Fe^{59} , In^{114}). It was established that the design of an installation with a ring-shaped crucible, divided by a partition, proved convenient. In this installation the motion of the ingot is performed by the continuous rotation at a required speed of a horizontal disk and the crucible. The authors describe a variant of

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SOV/137-59-12-26631

Preparation of Pure Metals by the Method of Multiple Zonal Recrystallization and the Use of Radioactive Isotopes to Investigate the Mechanism of Purifying the Metal From Admixtures by the Indicated Method

the installation for smelting easily-melted and low-melting substances (the latter with a refrigerator) and of high-melting metals. An installation for zonal melting by electronic bombardment is described. Information is also given on the possible preparation of an ingot with a constant concentration of the admixture over the length, on account of the circulation through the liquid zone of a metal with an initial content of the admixture.

Yu.Sh.

Card 2/2

SOV/126-6-1-22/33
AUTHORS: Aleksandrov, B. N., Verkin, B. I., Lifshits, I. M. and
Stepanova, G. I.

TITLE: On the Possible Causes of the Non-uniform Distribution
of Admixtures in a Crystallising Casting (K voprosu o
vozmozhnykh prichinakh neodnorodnogo raspredeleniya
primesey v kristallizuyemom slitke)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 1.
pp 167-168 (USSR)

ABSTRACT: In a paper published in 1956 by the authors (Ref.1) the
mechanism was investigated of purification of metals
from admixtures by means of zonal recrystallisation.
There it was assumed that in front of the crystallisation
front the conditions are such that solidification of the
melt does not take place; in this paper the possible
consequences are mathematically analysed of the non-
validity of this assumption. Numerical evaluation for
the system lead-tin (about 1% tin) indicates that for
this system a periodic "blocking up" of admixtures in
the solid phase can be anticipated. Indeed, exposures
obtained by contact radiography of Pb-Sn¹¹² castings
Card 1/2 showed a large number of transverse bands corresponding

SOV/126-6-1-22/33
On the Possible Causes of the Non-uniform Distribution of
Admixtures in a Crystallising Casting

to excess Sn admixture in these spots (Ref.1).
There is one Soviet reference.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Ukr. SSR
(Institute for Physics and Technology, Ac.Sc. Ukr.SSR)

SUBMITTED: January 7, 1957

Card 2/2

1. Metals--Purification 2. Metals--Crystallization
3. Mathematics--Applications

AUTHORS: Aleksandrov, B. M., Verbin, B. I. 207/56-3A-6-6/51

TITLE: The Free Path Length of Electrons in Tin of High Purity
(Dlina svobodnogo probega elektronov v olove vysokoy chistoty)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1956,
Vol. 34, Nr 6, pp. 1655-1656 (USSR)

ABSTRACT: The purification of the tin from admixtures was controlled by measuring the remanent resistance $\delta = R_{4,2}/R_{\text{room}}$ of specimens taken from various regions of a heated and recrystallized bar. $R_{4,2}$ denotes the resistance of the specimen at 4,2°K and R_{room} - its resistance at room temperature. A diagram shows the dependence of δ on the diameter of cylindric wires for tin with $\delta_{\infty} = 1,8 \cdot 10^{-5}$. A second diagram shows the dependence of σ/σ_{∞} for $p = 0$, σ denotes the conductivity of the specimen, σ_{∞} - the conductivity of the massive metal, and p - the probability that the electron is scattered elastically. The best consistency between the experimental and theo-

Card 1/2

The Free Path Length of Electrons in Tin of High Purity SOV/56-34-6-47/51

retical data may be obtained for the free path length $\lambda = 0,65$ mm. A table compares the data of this paper with those of other authors. All these data completely correspond with the results obtained by investigating the anomalous skin effect of tin. There are 2 tables and 8 references, 4 of which are Soviet.

ASSOCIATION: Fiziko-tehnicheskii institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute of the AS, UkrSSR)

SUBMITTED: March 26, 1958

Card 2/2

AUTHORS: Verkin, B. I., Dmitrenko, I. M.

SOV/56-35-1-47/59*

TITLE: The Influence of Uniaxial Elastic Deformations on the Magnetic Properties of Zinc Crystals at Low Temperatures (Vliyaniye odnoosnykh uprugikh deformatsiy na magnitnyye svoystva kristallov tsinka pri nizkikh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 35, Nr 1, pp. 291 - 293 (USSR)

ABSTRACT: It was of great interest to investigate the influence of the uniaxial elastic deformations of a lattice on the Haas (Gaaz) - Van Alfvén (van Al'fen) effect in zinc crystals in order to obtain a relation between the variation of the number of the charges in a group with an anomalously low number, and the sign of the change of c/a . c/a denotes the ratio of the crystal axes. A figure shows the apparatus for the elastic uniaxial compression or expansion of zinc crystals. First the anisotropy of the magnetic properties of a non-strained zinc crystal was investigated. This anisotropy was then measured for uniaxially expanded and uniaxially compressed crystals. Two diagrams demonstrate the results of the measurements, i.e. the periods T of

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The Influence of Uniaxial Elastic Deformations on the Magnetic Properties of Zink Crystals at Low Temperatures SOV/56-35-1 47/59

the oscillations of the susceptibility (which are caused by the "low-number group of the charges" (malochislennaya gruppa zaryadov) and the influence exercised by the uniaxial elastic compression of the zink crystals on the form of the curves $\Delta\chi(1/H)$. The second diagram demonstrates also the straight lines $n(1/H)$ which determine the period of the oscillations of the susceptibility of free and compressed crystals. The uniaxial compression of zink crystals in the interval $0 \leq 30^\circ$ increases the period of the susceptibility oscillation by 4 - 5%. θ denotes the angle between the field vector \vec{H} and the principal axis of the crystal. If θ increases, the increase of the oscillation period becomes slower. At $\theta = 70^\circ$ this period is not changed, and at $\theta = 80^\circ$ the oscillation period decreases slightly ($\Delta T/T \sim 1\%$). A uniaxial expansion of zink crystals in the interval $0 \leq 30^\circ$ reduces the period of the susceptibility oscillations by 2 - 3%. The amplitude of the susceptibility oscillations is diminished several times by a uniaxial elastic deformation of the crystal. A decrease (increase) of c/a causes an increase (decrease)

Card 2/3

The Influence of Uniaxial Elastic Deformations on the Magnetic Properties of Zinc Crystals at Low Temperatures SOV/50-11-1-17/59

of the numbers of the charges in the anomalous group. There are 2 figures, 1 table, and 2 references which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute of the AS Ukrainskaya SSR)

SUBMITTED: April 4, 1958

Card 3/3

ACCEPTED FOR PUBLICATION

of the field intensity. The following results were obtained: 1) The amplitude of oscillations sharply depends on temperature. 2) The amplitude of oscillations rises with magnetic field intensity, it decreases with change of the magnetic field in time. 3) The amplitude and period of oscillation does not depend on magnetic field intensity, as well as the dielectric interlayer of the capacitor. 4) The amplitude and period of oscillations depend sharply on magnetic field intensity with respect to crystallized axes of the capacitor. 5) Oscillations determined by dielectric parameters of the capacitor observed in their waveform at the points of the capacitor, regardless of the magnetic field, regardless of the change of the magnetic field in time. The

24 (2), 24 (3)

AUTHORS: Dmitrenko, I. M., Verkin, B. I.,
Lazarev, B. G.

SOV/56-35-2-4/60

TITLE: The Magnetic Properties of Metals at Low
Temperatures IV (Magnitnyye svoystva metallov pri
nizkikh temperaturakh IV). The Influence of Pressure
Brought to Bear From All Sides Upon the de Haas-van
Alphen Effect in Zinc Crystals (Vliyaniye vsestoronnego
szhatiya na effekt de Gaaza-van Al'fera u kristallov tsinka)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol 35, Nr 2, pp 328-339 (USSR)

ABSTRACT: The present paper aims at contributing towards facilitating
research work concerning the anisotropy of the magnetic
properties of crystals at low temperatures. Homogeneous
compression of samples (from all sides) was brought about
by applying the method developed by Lazarev et al. (Ref 10),
i. e. by allowing water to freeze in a bomb. The bomb
consisted of pure beryllium bronze (made by I. Bolgov).
Experimental conditions: Pressure p 1700 kg/cm²
Magnetic field H 20 000 Oe

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The Magnetic Properties of Metals at Low
Temperatures IV. The Influence of Pressure Brought to
Bear From All Sides Upon the de Haas-van Alphen Effect in Zinc Crystals

SOV/56-35-2-4/60

Temperature Interval 1,6 - 4,2°K

The samples investigated consisted of spectrally pure zinc supplied by the firm of Khil'ger, which was subjected to different kinds of treatment:

Zn-1: prepared according to reference 12. 7 times recrystallized Khil'ger-zinc.

Zn-2, Zn-3, Zn-4: (round) prepared in quartz shell according to Obreimov-Shubnikov; velocity of growth: 10, 15, 50 mm/hour.

Zn-7 (hexagonal) prepared by the method developed by Kapitsa, growth: 5 mm/hour.

First the de-Haas-van Alphen-effect in the free zinc crystals is dealt with. The results obtained are shown by diagrams (Figs 2 - 6) (Angle-dependence of oscillation periods of magnetic susceptibility for the numerically smallest group of mobile charges for two different orientations of the crystal; de Haas-van Alphen-fine-structure effect for 3 different orientations; dependence of the oscillation moment L_z/H^2 on orientation and temperature). The following

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The Magnetic Properties of Metals at Low Temperatures IV. The Influence of Pressure Brought to Bear From All Sides Upon the de Haas-van Alphen Effect in Zinc Crystals

SOV/56-35-2-4/60

investigations were carried out under pressure: The dependence of the period and of the amplitude of the oscillations for the smallest group of mobile charges in the case of different orientation of the crystal. For all θ - values (angle between H and the main axis of the crystal) the periods of these oscillations increase by 40 - 48 %. Homogeneous compression (from all sides) further causes a considerable decrease of the oscillation amplitude as well as a modification of its temperature-dependence. Experimental results are compared with the phenomenological theory of the effects of oscillations in metals. The author thanks A. M. Kosevich for discussing results. There are 7 figures, 3 tables, and 22 references, 15 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute, AS Ukrainskaya SSR)

Card 3/4

5 (4)

AUTHORS:

Manzheliy, V. G., Verkin, B. I.

SOV/76-33-8-13/39

TITLE:

Investigation of the Diffusion Phenomena in Liquefied Gases

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1758 - 1761
(USSR)

ABSTRACT:

An investigation method, as well as the corresponding apparatus, for the study of diffusion phenomena in liquefied gases at low temperatures were developed. The advantage of the method of the gaseous phase applied (Refs 1-4) in contrast with the capillary method (Ref 5) lies in the fact that the former permits the checking of the occurrence of a convection as well as the continuous recording of the diffusion coefficient as a function of the concentration. The system methane (I)-propylene(II) was investigated, since it possesses relatively simple molecules. The test arrangement (Fig 1) contains a copper flask (250 cm³) in which the pressure can be measured by means of a manometer and read by means of a cathetometer. The flask is contained in a Dewar vessel. The dependence of the diffusion coefficient of (I) and (II) on the concentration in the range of 0 - 27.5 mol% at 90.2°K was examined, and the results obtained were indicated (Table). The aggregate error in the determinations is given as

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Investigation of the Diffusion Phenomena in Liquefied Gases SOV/76-33-8-13/39

amounting to 6% at most. The authors thank V. A. Pkovets, Ye. A. Sen'ko, and G. L. Shatrovskiy. There are 2 figures, 1 table, and 5 references, 4 of which are Soviet.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo
(Khar'kov State University imeni A. M. Gor'kiy)

SUBMITTED: January 17, 1958

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308/53-67-4-7/7

22:

The Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vsesoyuznyye soobshcheniye po fizike nizkikh temperatur)

PHILOSOPHICAL

Эпштейн Е.И. *История науки*, 1953, Vol 67, Nr 4, pp 743-750
(русск.)

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III. ЗАЯВНО-РЕКЛАМНО-ПРОПАГАНДИСТСКИЕ (КУЛЬТУРНО-ПРОПАГАНДИСТСКИЕ) И Т. Д. ПОСРЕДНИКИ (КУЛЬТУРНО-ПРОПАГАНДИСТСКИЕ)

Drat'kov Physics-technical Institute, Drat'kov (Enlves313)
(10 section) - Drat'kov

absorbed that the most important factor in determining the catalytic properties of metals is played by the concentration of valence electrons. The role of the Fermi surface of conductivity electrons, the

Allexeevskiy (IFP) spoke about experiments he carried out with Dr. P. Gaydukov. The variation of the rate of polymerization of methyl methacrylate at different temperatures was studied at half-conversion. The results are shown in Figure 1.

of the resistance in the fast-scan range (100-1000 Hz) and (together with temperatures of Al, Cu, Pb, Zn, Ga, In and Cd) to calculate the total effective resistance of the system.

Dr. Z. Kostina) of Dr. Ye. S. Zolotarev and Dr. V. A. Zolotarev investigated the catalytic properties of COPTI and found that the

temperatures of chromium and resistance of chromium alloys with steel strength without any

being a saturation value. W.C. Brown investigated the resistance minimum in gold at low temperatures and found that if the sample is heated, the minimum

trees and found that as the temperature of the discussion rose and found that as the temperature of the discussion rose

In the course of the investigation it was found that the occurrence of the minimum is explained by the plastic deformation of the material.

of the sample at helium temperatures. Dr. H. G. Stetson gave a report of his work in connection with the (D-1) in the presence of Estlin.

quantum theory of the high-frequency resistance of metals in a constant magnetic field at low temperatures. N. I. Kabanov (Leningrad) made about a theoretical investigation of the high-frequency resistance of metals in a constant magnetic field at low temperatures. N. I. Kabanov (Leningrad) made about a theoretical investigation of the high-frequency resistance of metals in a constant magnetic field at low temperatures.

and V. M. Zaukernik (ENRIS) spots more and more the influence exercised by thermoelectric forces in the operation of the thermocouples. B. I. Verkin and

Upon the skin effect in various cases of the
B. G. Alexandrov (KhFTI) spoke about measurements of the
dependence of skin effect from highly-pure

electric resistance of the film. Indium and cadmium, and computed the free lengths of film. Indium and cadmium, and computed the free lengths of film. Indium and cadmium, and computed the free lengths of film.

PAID AT 402 A. M. Verkin and I. P. Dolitsky
I. P. Dolitsky (MCU) and A. I. Verkin and I. P. Dolitsky
(MCU) investigated the influence exercised by the hydro-

static pressure (of 1000 atmospheres absolute pressure) and the behavior of metals at low temperatures and investigated

the quantum oscillations of the magnetic susceptibility of G. Ye. Fil'berman and A. M. Kosevich at 1.6 - 4.2 K.

vich (DVP-I) gave a theoretical explanation of why the deformation of the crystal lattice is already relatively small deformations are considered.

influence upon oscillation effects in various
A. S. Borovik-Romanov (IYP) delivered a report on investigation of the anisotropy of the weak ferro-

These results are in good agreement with the results obtained by other workers. The effect of antiferromagnetic ordering on the magnetic properties of the samples was predicted by the theory of the magnetic properties of antiferromagnets.

theory developed by Dyalozhnitskiy). In the course of the discussion B. A. Altkhanov (IRP) spoke about neutrino oscillations.

Graphical investigations have been carried out of the magnetic structures of MgCO_3 and FeCO_3 at low temperatures. P. L.

the importance of the Eastot based upon
Empire stressed
Bavonshinsky's theory. W. X. Zeyres (WILKIN), whose
accounted on

lecture was read by A. S. Borovik-Rozhnov, reported on by V. A. Kozlov, and the results of the work of the Institute of the Academy of Sciences of the USSR were carried out by him (in the USSR).

drop of the antiferromagnetic χ_{500}^0 and χ_{1000}^0 at 5 K.

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Card 6/11

Card 5/11

24(2),24(3)
AUTHORS:

Verkin, B. I., Dmitrenko, I. M.

SOV/20-124-3-17/67

TITLE:

The Dependence of the Main Characteristics of the Effect of
de Haas-van Alphen in Crystals of Zinc on Pressure (Zavisi-
most' osnovnykh kharakteristik effekta de Khaaza-van Al'fena u
kristallov tsinka ot davleniya)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 3, pp 557-558
(USSR)

ABSTRACT:

The present paper discusses the experimental investigation of
the magnetic properties of zinc crystals at low temperatures
in a constant field and at various pressure values. The method
of investigating the anisotropy of the magnetic properties of
zinc crystals consisted as before in measuring the pair of
forces acting upon this crystal. In this case the crystal
was mounted in a high-pressure bomb which was magnetically iso-
tropic and which was suspended on a thin thread within a
homogeneous magnetic field. The magnetic properties of the
zinc crystals were investigated at the temperatures of 4.2,
14 and 20° K in the pressure interval $0 \leq p \leq 1,750 \text{ kg/cm}^2$ and
at field strengths $H \leq 20,000$ oersted. The maximum pressure

Card 1/3

The Dependence of the Main Characteristics of the SOV/20-124-3-17/67
Effect of de Haas-van Alphen in Crystals of Zinc on Pressure

in the bomb was attained by means of frozen water at a constant volume; for lower pressures aqueous solutions of ethyl alcohol were used. The results obtained by the investigations are shown in form of a diagram. The dependence of the period of the oscillations of susceptibility of pressure has a very complicated periodic character, and the course taken by the curves and also the relative pressure dependence of the period in the case of the two values of θ are practically equal. Here θ denotes the angles between the crystallographical axis of the zinc crystals in the bomb and the field vector. As expected, the anisotropy of the magnetic properties of zinc-crystals oscillates with pressure at $H = \text{const}$, but this effect is rendered very complicated by the periodic dependence of the period on pressure. However, not only the period, but also the amplitude of oscillations depends non-monotonously on pressure. These and other data given here lead to the discovery of two new characteristic features of the de Haas-van Alphen effect: 1) The period of the oscillations of zinc susceptibility depends periodically on pressure. 2) Whereas the period in the case of free zinc crystals at $T < 20.4^\circ \text{K}$

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The Dependence of the Main Characteristics of the SOV/20-124-3-17/67
Effect of de Haas-van Alphen in Crystals of Zinc on Pressure

does not depend on temperature, the period of the oscillations of susceptibility of a crystal subjected to a pressure of $1,000 \text{ kg/cm}^2$ increases considerably with rising temperature (within the same temperature interval). These two particular features cannot be explained by the present theory on the de Haas-van Alfvén effect. The experimental data determined by the present paper may perhaps be explained by the attenuation of the inequations $kT \ll E_0$ and $\mu H \ll E_0$ as a result of the reduction of E_0 (the significance of this quantity is not defined), and also by consideration of the periodic dependence of the chemical potential of the electrons on pressure. The authors thank A. M. Kosevich for discussing the results of this paper. There are 1 figure and 9 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR (Physico-technical Institute of the Academy of Sciences, Ukrainskaya SSR)

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S/126/60/009/03/008/033
EO91/E435

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AUTHORS: Aleksandrov, B.N. and Verkin, B.I.
TITLE: Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation
PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 3,
pp 362-365 (USSR)

ABSTRACT: This work is a study of the possibilities of further
purification of electrolytically refined cadmium.
Electrolytic cadmium of the following original
composition was used: Tl, As, Sb, Bi, Ni, Cu less than
 $1 \times 10^{-4}\%$ each; Pb $2 \times 10^{-4}\%$, Fe $(3-5) \times 10^{-4}\%$,
Zn $(5-7) \times 10^{-4}\%$ (ie it is more than 99.998% pure). The
ratio $\delta = \frac{R_{4.2}}{R_{kom}}$ (where $R_{4.2}$ is the electrical resistance
of the metal at the boiling point of liquid helium ($4.2^\circ K$)
and R_{kom} is the electrical resistance of the same
specimen at room temperature) and the free run of
electrons in the helium temperature range are properties
sensitive to the total quantity of chemical impurities.
The value of δ was measured by means of a low-resistance

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Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

compensator and a high-sensitivity galvanometer on a few polycrystalline wires of 2 to 3 mm diameter which had been annealed in air at 120°C for 6 to 10 hours. The length of the free run was estimated by methods described by Riedel (Ref 5) and Andrew (Ref 6) in which the dependence of δ on the thickness of a plate of electrolytically pure cadmium is measured at 4.2°K. The plates were prepared by rolling with subsequent pickling and annealing in air at 120°C for many hours. After annealing, the grain size was greater than the thickness of the plate. The results of these measurements are shown in Fig 1b. By using Fuchs's theoretical table (Ref 7) for the diffusion scattering of electrons at the boundary of the specimen and adopting the relationship $\delta_{\infty} = 1.5 \times 10^{-4}$ for a massive specimen, good agreement between the experimental results and the theoretical curve was obtained at a free electron run length of 0.4 mm (Fig 1a). From Sondheimer's formula (Ref 4), the number of electrons per atom of metal can be calculated and in this case is 0.1. The results of the estimation of the value of δ

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Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

and of the length of free run of electrons in cadmium of various chemical purities are shown in the table on p 363. Zone refinement of cadmium ingots weighing 150 to 170 g was carried out in tantulum boats (0.1 mm thick and 350 mm long) which were placed inside a quartz tube (35 mm diameter and 1200 mm long); three resistance furnaces were placed in position around the tube which simultaneously created three liquid zones, each 40 mm long. The rate of crystallization was 25 mm/hour. The boat was placed at an angle of 1 to 1.5° to the horizontal in order to avoid overflow of the metal into the head of the ingot, thus causing multiple crystallization (Ref 11). In view of the great volatility of cadmium at its melting point, the purification was carried out in an argon atmosphere at a pressure of 760 mm Hg. The results of purification of two ingots are shown graphically in Fig 2. The purity of the original cadmium ingot is shown by a line of dashes. The distillation of cadmium was carried out in a quartz tube in a vacuum of 10^{-4} mm Hg

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E091/E435

Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

at 450 to 500°C. It was found that after distillation
~~600~~ for cadmium was 7×10^{-5} . The authors express
gratitude to D.P.Zosimovich for the preparation of
electrolytic cadmium. There are 2 figures, 1 table and
11 references, 4 of which are Soviet, 4 English and
3 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Institute of Physics and Technology AS UkrSSR)

SUBMITTED: June 19, 1959

Card 4/4

✓

VERKIN, B. I.

82596

S/056/60/039/01/04/029
B006/B070

24.7600

AUTHORS: Aleksandrov, B. N., Verkin, B. I., Svechkarev, I. V.

TITLE: The Temperature Dependence of the Susceptibility of Indium, Lead, and Tin Crystals

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 1 (7), pp. 37-43

TEXT: The temperature dependence of the susceptibility of a number of elements is related directly to their position in the periodic system, that is with the presence of small electron groups and must, therefore, be characteristic of all elements which show a de Haas-van Alphen effect with large period. To test this hypothesis, the authors investigated the temperature dependence of the susceptibility of Pb, In, and Sn which crystallize in cubic or tetragonal forms. The samples investigated were of high purity and in the form of small spheres of 0.35-0.5 g weight. Determination of the principal values of susceptibility was done with the help of a modification of Faraday's balance method. Fig. 1 shows a scheme of the experimental arrangement and the position

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The Temperature Dependence of the Susceptibility of Indium, Lead, and Tin Crystals S/056/60/039/01/04/029
B006/B070

of the sample in the magnetic field. To eliminate the effect of the medium, the measuring apparatus is evacuated and filled with low pressure hydrogen. The apparatus and the experiment are very minutely described in the introduction. The measurements were made between room temperature and 20.4°K, where the liquids CH₄, O₂, N₂ and H₂ served as coolants. The observed values of $\chi_{||}$, χ_{\perp} and $\Delta\chi$ are compiled in a table, and compared with the results of other authors. The results are represented graphically in Fig. 2. Indium: $\chi_{\perp}(T)$ and $\Delta\chi(T)$ were measured for two samples and identical results were obtained. Fig. 2 shows $\chi_{\perp}(T)$ and the calculated values of $\chi_{||}(T)$. χ_{\perp} increases by 20% during a temperature drop of from room temperature to 80°K, goes to a maximum, comes down, and at 20.4°K still lies 15% higher than the value at room temperature. $\chi_{||}$ increases monotonously to 20°K reaching about thrice the value, and at ~100°K has a point of inflection. Lead: $\chi(T)$ and the anisotropy in the (110) plane were investigated for two samples. χ increases practically linearly with a fall of temperature and is 20% higher at 20.4°K.

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The Temperature Dependence of the Susceptibility of Indium, Lead, and Tin Crystals

S/056/60/039/01/04/029
B006/B070

No anisotropy is observed. Tin: This shows a positive susceptibility. $\chi_1(T)$ was investigated along the normal to (010) plane, and $\Delta\chi(T)$ in the (100) plane. It was found that, in contrast to other elements of this group, $|\chi|$ decreases linearly with fall of temperature down to 20.4°K (χ_1 by 6% and χ_1 by 15%). These results are discussed in conclusion and are compared with the theoretical and experimental results of other authors (Fig. 2). G. Ye. Zil'berman and F. I. Itskovich are mentioned. There are 3 figures, 1 table, and 23 references: 9 Soviet, 4 British, 4 American, 1 German, 1 French, and 2 Dutch.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademiyi nauk Ukrainiskoy SSR
(Physicotechnical Institute of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: February 13, 1960

Card 3/3

9,4300 (1137, 1147, 1158)
24.2200 1138, 1164, 1160, 1055

S/056/61/040/002/042/047
B102/B201

AUTHORS: Verkin, B. I., Dmitrenko, I. M., Svechkarev, I. V.

TITLE: Magnetic properties of beryllium at temperatures from
300 to 4.2°K

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
v. 40, no. 2, 1961, 670-671

TEXT: Studies of the magnetic properties of pure elements displaying a long-period de Haas - Van Alphen effect have involved examinations of pure beryllium single crystals, which are briefly discussed in the paper. Measurements were made by the Faraday method in the vertical gradient of fields up to 10 koe; photoelectric self-compensation was applied in the process (cf. B. V. Deryagin, DAN SSSR, 61, 275, 1948, or Hedgcock, Phys. Rev. 104, 1564, 1956). Absolute measurements were accurate within ~2%, relative measurements within ~0.5%. The angular dependence of the magnetic susceptibility in the temperature range between 300 and 4.2°K was measured on two beryllium single crystal specimens (Be-1 and Be-2, ~99.99% pure), and two indium specimens (In-1 and In-2).

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Magnetic properties of beryllium ...

S/056/61/040/002/042/047
B102/B201

The result is presented in Fig. 1. Prior to the appearance of the de Haas - Van Alphen effect, the angular dependence of χ in Be can be described by the law $\chi(\theta) = \chi_{\parallel} \cos^2 \theta + \chi_{\perp} \sin^2 \theta$ (solid curves in Fig. 1). The main values of susceptibility ($\chi_{\parallel} = 2.38 \cdot 10^{-6}$; $\chi_{\perp} = 0.80 \cdot 10^{-6}$ cm³/g) and their temperature dependence are in good agreement for both Be specimens. The character of the growth of $|\chi_{\perp}|$ with temperature can be explained by the contribution made by the paramagnetism of a small group of electrons (or holes). In analogy to most of the elements studied previously, anisotropy decreases with growing temperature, and the temperature-dependent component of susceptibility has an asymptotic approach to the temperature-independent (or poorly dependent) component. χ_{\perp} in beryllium displays not only a temperature dependence, but, already at $\sim 20^\circ\text{K}$, a periodic field dependence as well, which is indicative of the fact that, as applies also to other elements, the phenomena are associated with the existence of small groups of mobile charges. For indium specimens $\chi(\theta)$ also follows the cosine law (Fig. 1). Although both specimens were made of the same initial material,

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Magnetic properties of beryllium ...

S/056/61/040/002/042/047
B102/B201

deviations appeared in the absolute values of χ . This is probably due to the existence of small amounts of impurities having an appreciable effect in In as well as in Bi and Sb. The strong anisotropy of this metal is said to be probably caused entirely by a small group of carriers, which does not manifest itself in electric or galvanomagnetic properties. Professor B. F. Lazarev is thanked for having permitted work to be conducted at the low-temperature laboratory of the FTI AN USSR (Institute of Physics and Technology, AS UkrSSR), and A. A. Kruglykh for having supplied the Be single crystals. [Abstracter's note: The word laboratoriya (laboratory) seems to be omitted in the "Association".] There are 2 figures and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR (Institute of Physics and Technology for Low Temperatures, Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: September 14, 1960

Card 3/4

VERKIN, B.I. [Vierkin, B.I.]; SVECHKAREV, I.V. [Sviechkar'ov, I.V.]

Temperature dependence of the magnetic susceptibility of Ti,
Mg, and Ca single crystals. Ukr.fiz.zhur. 7 no.3:322-326

Mr '62.

(MIRA 15:7)

1. Fiziko-tekhnicheskii institut nizkikh temperatur AN USSR,
g. Khar'kov.

(Titanium crystals--Magnetic properties)
(Magnesium crystals--Magnetic properties)
(Calcium crystals--Magnetic properties)

ACCESSION NR: AP4043609

S/0056/64/047/002/0404/0413

AUTHORS: Verkin, B. I.; Svachkarev, I. V.

TITLE: Magnetic properties of indium alloys. I. Solid solutions of Cd, Sn, and Pb in In

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 404-413

TOPIC TAGS: magnetic susceptibility, electron spectrum, indium alloy, valence, diamagnetism, solid solution, cadmium, tin, lead

ABSTRACT: The purpose of the investigation was to clarify whether investigation of the magnetic susceptibility as a function of the temperature and of the valence can be used to study the fine details of the electron spectrum. This investigation includes the determination of the adequacy of the Landau-Peierls approximation for describing the susceptibility in the case of alloys of a normal multivalent metal (in contradistinction to the semimetal bismuth), and

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ACCESSION NR: AP4043609

the extraction, on the basis of this approximation, of the maximum information about the spectrum and its variation under the influence of the impurities. Indium was chosen because it has a well defined magnetic-susceptibility temperature dependence in a convenient temperature range and forms a wide range of solid solutions with its closest neighbors in the periodic table. The magnetic susceptibility variation was investigated in the temperature in the range from 20.4 to 300K and valence range from 2.95 to 3.10. The results show that the temperature dependence susceptibility of indium alloys cannot be successfully described by the Landau-Peierls contribution. It is more natural to attribute the diamagnetism to a contribution arising from virtual transitions between bands, separated by a small energy gap (Adams contribution). The anomalous diamagnetism of indium disappears when Z is increased by 2%. Information on the electron structure of indium alloys can be obtained on the basis of the Adams contribution of inter-band interactions. These contributions can be expected to appear in frequent cases (for

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ACCESSION NR: AP4043609

example, in cadmium). "The authors thank N. V. Volkenshteyn and S. S. Shaly*t for permitting part of this work to be performed in their laboratories, to the staff members of the laboratory for assistance, to their colleagues at FTINT AN UkrSSR for preparation of the samples, B. N. Aleksandrov for a number of pure metals, and G. Ye. Zil'berman and F. I. Itskovich for a discussion of the results and valuable advice." Orig. art. has: 6 figures and 6 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut nizkikh temperatur Akademii nauk Ukrainskoy SSR (Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukrainian SSR)

SUBMITTED: 22Feb64

ENCL: 00

SUB CODE: 88

NR REF SOV: 011

OTHER: 013

Card 3/3

TOPIC TAGS: indium alloy, solid solution, beta phase, magnetic

stability, crystal structure, phase transition, magnetic susceptibility, and other properties.

Abstract: This paper reports on the results of a study of the magnetic properties of indium alloys. The study was conducted using a variety of techniques, including X-ray diffraction, neutron diffraction, and magnetic susceptibility measurements. The results show that the magnetic properties of indium alloys are strongly dependent on the composition and the crystal structure of the alloy. The authors report a study of the magnetic properties of indium alloys as a function of the

composition.

ACCESSION NR: AP4046393

5

ACC: 141 AF0007917 IJF(c) JD/HM/JH UR/0125/66/000/002/0010/0014

AUTHOR: Verkin, B. I.; Kravchenko, Ye. L.; Lyulichev, A. N.

ORG: Physicotechnical Institute of Low Temperatures, AN UkrSSR (Fiziko-tekhnicheskii institut nizkikh temperatur AN UkrSSR)

TITLE: Interlocking of aluminium with copper in high vacuum

SOURCE: Avtomaticheskaya svarka, no. 2, 1966, 10-14

TOPIC TAGS: metal bonding, cold welding, gas adsorption, compressive stress, high vacuum, adhesion, aluminium, copper, manometric lamp/LM-2 manometric lamp, IM-12 manometric lamp

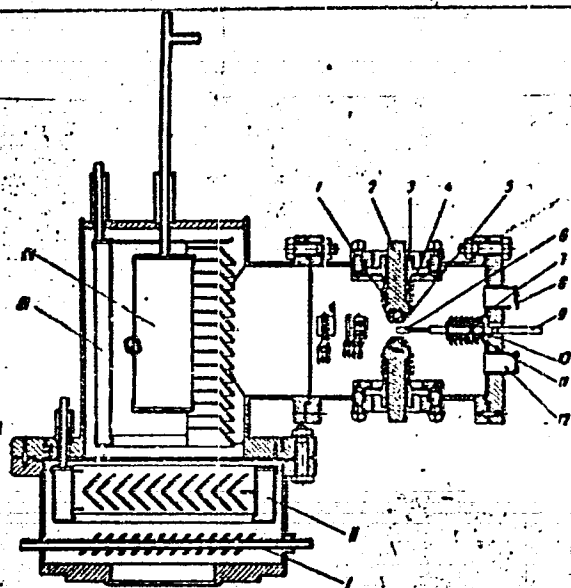
ABSTRACT: This investigation was intended to determine the effect of the purity of surface on adhesion between metals (Al and Cu in high vacuum -- 10^{-9} - 10^{-5} mm Hg), with the required compressive stress used as the criterion of adhesion. A specially developed experimental setup was used for this purpose (Fig. 1). Mounted within the chamber are: working assembly 1-5, device for cleaning the surface of specimens 6-12, and manometric lamps LM-2 and IM-12. The working assembly is designed to compress the specimens together. It is represented by two identical inserts, each consisting of punch 1, rod 2, guide bush 3 and sylphon 4. Specimen 5 is attached directly to the punch. The load is applied via rods 2 by means of a Brinell press. To remove oxide films from the surface directly within the chamber, use is made of a cleaning assembly

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UDC: 621.792.8

L. 22027-66

ACC NR: AP6007917



—Toward N-5 pump

Fig. 1. Diagram of high-vacuum part of the setup:

I - water trap; II, III - nitrogen traps; IV - condensing hydrogen pump

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L 22027-66

ACC NR: AP6007917

consisting of scraper 6, sylphon 7, rod 9, pivot 10 and washer 11. Peepholes 8, 12 make it possible to observe cleaning. The setup is evacuated by means of a N-5 diffusion pump. Traps I-III are designed to assure reliable freeze-out of the pump's oil vapors as well as of the decomposition products. Findings: even insignificant contamination of Al and Cu surfaces increases the required compressive stress by one order of magnitude. Cleaned surface of Al in a vacuum of $1 \cdot 10^{-9}$ mm Hg is contaminated by adsorbed gases. The degree of contamination is proportional to the product of pressure and exposure time, i.e. to the amount of gas adsorbed at the surface from the chamber's interior; mechanical cleaning of the surface is naturally ineffective in such cases. Thus more effective methods of surface treatment of specimens are needed before the aspects of adhesion between metals in high vacuum can be properly investigated. It can be established, however, that the compressive stress is not a physical characteristic of the adhesive properties of pure surfaces, since it is a function of surface roughness. Thus it is theoretically possible that atomically smooth and pure surfaces can mutually interlock without requiring mechanical compression: Orig. art. has: 6 figures.

SUB CODE: 11, 13, 20/ SUBM DATE: 09Sep65/ ORIG REF: 006/ OTH REF: 005

vacuum diffusion bonding₁₂

bonding of dissimilar metals₁₂

Card 3/3

ACC NR: AP6024859 SOURCE CODE: UR/0056/66/051/001/0025/0027

AUTHOR: Verkin, B. I.; Chekin, V. V.; Vinnikov, A. P.

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences, Ukrainian SSR (Fiziko-tekhnicheskii institut nizkikh temperatur Akademii nauk Ukrain'skoy SSR)

TITLE: Effect of impurities on isomer shifts in metallic tin

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 1, 1966, 25-27

TOPIC TAGS: tin, Mossbauer effect, nuclear isomer, low temperature research, absorption spectrum, line width, impurity center, nuclear resonance

ABSTRACT: To check whether it is correct to ignore the changes in the properties of the host in studies of the Mossbauer effect, the authors have determined the isomer shifts for Sn^{119} in natural (metallic) tin to which Na, Zn, Cd, Ge, In, Sb, Po, or Bi was added as an impurity. The source of the resonant γ radiation was $\text{Mg}_2\text{Sn}^{119}$; the source and absorber were maintained at liquid-nitrogen temperature. In all cases the absorption spectra consisted of singlet lines with half-widths that did not differ appreciably from those of pure tin having the same thickness. The shift was determined from the difference in the counting rate at source velocities corresponding to the maximum slope of the pure-tin absorption line, and was also checked by determining the absorption-line center of gravity for the impure tin. The spectra show that a relatively small amount of impurity has some effect on the density of the s-electrons in tin nuclei. However, the impurities do not all have the same effect with regard to

Card 1/2

L 081b9-b7

ACC NR: AP6024859

isomer shifts. Within the limits of experimental error, the presence of Ge, Pb, In, Sb, or Bi in tin has no effect on the isomer shift. With Zn or Cd, the isomer shift is enhanced, and starting with a concentration ~0.5 at.%, the shift remains approximately constant at 0.06 ± 0.02 mm/sec. The pattern is similar for ^{119}Sn , but the isomer shift lies systematically between the shifts for pure tin and tin doped with Zn or Cd. It is proposed on this basis that the impurity changing the isomer shift is the one having valence s-electrons. Consequently, when the properties of metal lattices are investigated by the Mossbauer effect for impurity atoms, the impurity concentration cannot be chosen arbitrarily in the general case. The authors thank L. S. Kukushkin for a discussion of the results, and P. N. Aleksandrov for providing the pure metal samples. Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 21Jan66/ OTH REF: 003

Card 2/2 nst

L 43692-66 EAT(m)/T/EMP(t)/ETI IJP(c) ID
ACC NR: AP6018824 SOURCE CODE: UR/0056/66/050/005/1438/1444

AUTHOR: Verkin, B. I.; Svechkarev, I. V.; Kuz'micheva, L. B.

ORG: Physicotechnical Institute of Low Temperatures, Academy of Sciences,
Ukrainian SSR (Fiziko-tehnicheskii institut nizkikh temperatur Akademii nauk
Ukrainskoy SSR)

TITLE: Magnetism of conduction electrons of nontransition polyvalent metals

SOURCE: Zh eksper i teor fiz, v. 50, no. 5, 1966, 1438-1444

TOPIC TAGS: conduction electron, magnetic susceptibility, temperature dependence,
magnetism, electron structure, polyvalent metal

ABSTRACT: A comparison of temperature dependences of magnetic susceptibility
with the Landau — Peierls theory shows that it does not describe the experimental
data for polyvalent nontransition metals. The magnetism of these metals can be
explained on the basis of qualitative considerations regarding the contribution

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1-45692-66

ACC NR: AP6018824

of interband interaction. In particular, the temperature dependences of the susceptibility, seen in the two-band model, explain all the modifications in pure metals and alloys, in accordance with the electron structural features. Orig. art. has: 2 figures and 1 table. [Based on authors' abstract] [NT]

SUB CODE: 20/ SUBM DATE: 23Dec65/ ORIG REF: 009/ OTH REF: 023/

Card 2/2

L 38882-66 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) AT/JD

ACC NR: AP6018571

SOURCE CODE: UR/0181/66/008/006/1947/1948

AUTHOR: Verkin, B. I.; Dudko, K. L.

ORG: Physicotechnical Institute of Low Temperatures, AN UkrSSR, Khar'kov (Fiziko-tekhnicheskii institut nizkikh temperatur AN UkrSSR)

TITLE: On the nature of the photomagnetic anomaly in germanium 21

SOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1947-1948 86 85 B

TOPIC TAGS: germanium semiconductor, photomagnetic effect, semiconductor carrier, carrier density, electron recombination, magnetic moment, surface property, diamagnetism, physical diffusion

ABSTRACT: The authors point out that in measurements of the contribution of carriers to the magnetic susceptibility of a semiconductor by determining the change in the carrier density upon illumination involves a contribution due to surface recombination, which has not been accurately evaluated in earlier experiments by others. They have therefore used an induction procedure to register the changes of the magnetic moment of a sample illuminated by short flashes ($\sim 5 \times 10^{-6}$ sec) of strongly absorbed light from a flash lamp. In this method the change of the magnetic moment M of the sample, placed inside a measuring coil, induces in the coil a voltage proportional to dM/dt , which is displayed on an oscilloscope after amplification and measured. The tests were made on cylindrical n-Ge samples cut from single-crystal ingots, in which the rate of surface recombination was varied by mechanical polishing and by treating

Card 1/2

L 38882-66

ACC NR: AP6018571

with different etchants. When the illumination was applied to the side surface of the sample, the moment was paramagnetic and related with the photomagnetic effect on the diffusion flow of carriers inside the sample. If the light was incident only on the face of the sample, the observed moment was diamagnetic. Although this effect has been attributed to the diamagnetism of excitons produced upon recombination of the electron-hole pairs, it can also be explained as due to photomagnetic currents. Experiments with variation of the rate of surface recombination showed that the diamagnetic moment remains practically unchanged with increasing rate of surface recombination, in spite of the fact that the over-all magnetic moment increased noticeably. This is taken as proof that the photomagnetic anomaly observed in germanium is connected with the photomagnetic effect on the diffusion currents at the edges of the illuminated area of the sample. The authors thank V. V. Yeremenko for interest in the work and useful discussions. Orig. art. has: 1 figure.

SUB CODE: 20/ SUBM DATE: 29Dec65/ ORIG REF: 001/ OTH REF: 004

Card 2/2

ACC NR: AP7001948

SOURCE CODE: UR/0120/66/000/006/0129/0133

AUTHOR: Verkin, B. I.; Dudko, K. L.

ORG: Physico-Technical Institute of Low Temperatures, AN UkrSSR (Fiziko-
tekhnicheskiiy institut nizkikh temperatur AN UkrSSR)

TITLE: Impulse method for measuring photomagnetic susceptibility [Reported at
the 11th All-Union Conference of Low-Temperature Physics, 1964]

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1966, 129-133

TOPIC TAGS: photomagnetic susceptibility, photomagnetic effect

ABSTRACT: J. P. Van der Ziel et al. described their induction method of
measurement of the magnetic moment induced in various substances by a laser
flash, with no magnetic field applied (Phys. Rev. Letters, 1965, 15, 190). The
present article describes a method which differs from the above in (a) possibility

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UDC: 621.317.41

ACC NR: AP7001948

of operation in impulse magnetic fields and (b) use of simpler light sources. In the experiments, a solenoid supplied from a 9-kj capacitor bank developed a magnetic peak of 150 koe with a duration (half-period) of 0.05 sec. Soviet-made ISSh-100 and ISSh-500 flash lamps were used to produce single flashes with up to 10^{18} light quanta. Thus, the magnetic-pulse duration exceeded that of the light flash by thousands of times. The method is applicable to substances having short light-excitation life; the method permits observing the kinetics of relaxation of such substances. The sensitivity of the experimental outfit was 10^{-11} CGSM.

Operation of the outfit was tested with Ge single crystals previously studied by a stationary method; a typical oscillogram is shown. "The authors wish to thank V. V. Yeremenko and I. V. Svechkarev for their constant interest in this work and useful discussions." Orig. art. has: 6 figures and 4 formulas.

SUB CODE: 20 / SUBM DATE: 27Dec65 / ORIG REF: 005 / OTH REF: 006

Card 2/2

GERSHUNS, A.L.; VERKINA, L.I.

Certain rearrangements in the furan series. Ukr.khim.zhur.17 no.2:
280-284 '51. (MIRA 9:9)

1.Khar'kovskiy gosudarstvennyy universitet.
(Furan) (Rearrangements (Chemistry))

VERKITS, Gyorgy, okleveles villamosmérnök, főmérnök

Technical development of street lighting in the light of economy.

Villamoság 11 no.10:291-298 0 '63.

1. Budapest Főváros Elektromos Múzei.

VERKITS, Gyorgy, okl.villamosmernok

Modernization of the street lighting of the capital city of
Budapest. Villamosag 10 no.3:65-77 Mr '62.

1. Budapest Fovaros Elektromos Muvei fomerneke

VERKETS, Gyorgy, fomernok

Electric power distribution in Budapest during the past 7 decades. Villamosag 12 no.1:1-3 Ja'64.

1. Budapest Fovaros Elektromos Muvei.

OSZTROVSZKY, Gyorgy; Schiller, Janos; PALFI, Laszlo, okleveles villamosmernok; BOZSIK, Ferenc; GYORI, Attila, okleveles villamosmernok, foenergetikus; VARGA, Endre, okleveles gepeszmernok; TURAN, Gyorgy, okleveles gepeszmernok; SZENDY, Karoly, dr., fokonstruktor; KOVACS, Ferenc, okleveles villamosmernok; CSILY, Jenő, fodiszpecser; BEREZNAY, Frigyes, fomer-nok; PALOS, Ferenc, okleveles mernok; FILARSZKY, Zoltan, okleveles gepeszmernok; NEMETH, Imre, okleveles villamosmernok, fcmernok; AL-PAR, Imre, okleveles gepeszmernok, foenergetikus; GATI, Geza, okle-veles villamosmernok; BEKE, Gyula, okleveles gepeszmernok; VISNYOV-SZKY, Endre, foeloadó; VERKITS, Gyorgy, okleveles villamosmernok, fo-mernok; FUTÓ, Istvan, okleves gepeszmernok; NAGY, Karoly; PIKLER, Ferenc; SZEPESSY, Sandor, okleveles gepeszmernok; NADAY, Zoltan, ok-leveles gepeszmernok, fotechnologus; BUCHHOLCZ, Janos, okleveles gepeszmernok, fomer-nok

An account of the 11th itinerant meeting of the Hungarian Electro-technical Association held in Pecs, July 18-20, 1963. Energia es atom 16 no.12:559 D '63.

(Continued on next card)

VERKLOV, B.A., inzh.

Sealing fast-rotating shafts. Vest.mash. 40 no.11:78-79 № '60.
(MIRA 13:10)

(Sealing (Technology))

F		M	
<p>3785. CEMENT MANUFACTURE AS A WAY OF UTILIZING BOILER SLAG AND SPARE WORKING CAPACITY OF ELECTRIC POWER STATIONS. Verkmán, A. M. and Romashkov, B. B. (Stroitel'naya Promyshlennost', 1946, Vol. 23, Nos. 10-11, 4-7). A report is given of the manufacture of slag cement based on the residue from lean coal burnt at electric power stations. Of the three components, fly-ash, boiler-ash, and slag, as a rule only the last is used, though the admixture of boiler-ash is admitted in special cases. At the Novosibirsk power station a cement of equivalent quality to one based on granulated blast-furnace slag (strength grade 80), but with a shorter settling time, is obtained with 20 per cent slaked lime, 3 per cent gypsum and 77 per cent slag. Another cement is composed of 70 per cent slag, 27 per cent Portland cement and 3 per cent gypsum (strength grade 200). The production is so organized that mainly the reserve machinery of the grinding and crushing</p>			
<p>ASB-51A METALLURGICAL LITERATURE CLASSIFICATION</p>			

equipment is utilized, the machines operating during periods
of reduced consumption of electric power.

B.R.S.

VERKIN, B.I.; PELIKH, L.N.; YEREMENKO, V.V.

Quantum oscillations of the contact potential difference of
the bismuth-niobium pair. Dokl. AN SSSR 159 no.4:771-774 D '64
(MIRA 18:1)

1. Fiziko-tekhnicheskii institut nizkikh temperatur AN UkrSSR.
Predstavleno akademikom P.L. Kapitsey.

AL'SHITS, Yakov Isaakovich, dots.; VERKLOV, Boris Abramovich; VCROVITSKIY, Abram Nakhimovich, dots.; KOSTYUKEVICH, Fedor Vasil'yevich, dots.; MALEYEV, Georgiy Vasil'yevich, dots.; OSOKIN, Pavel Andreyevich, assist.; ROZENBERG, Boris Lazarevich, dots.; LADYGIN, A.M., inzh. retsenzent; SHURIS, N.A., red.; SHOROKHOVA, A.V., red. izd-va; BOLDYREVA, Z.A., tekhn. red.; MAKSIMOVA, V.V., tekhn. red.

[Mining machinery] Gornye mashiny. By IA.I.Al'shits i dr. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1961. 491 p.
(MIRA 14:12)

1. Glavnyy inzhener Spetsial'nogo konstruktorskogo byuro Kopeyskogo mashinostroitel'nogo zavoda (for Verklov).
(Mining machinery)

S/122/60/000/011/019/020
A161/A127

AUTHOR: Verklov, B. A., Engineer

TITLE: Seals for high-speed shafts

PERIODICAL: Vestnik mashinostroyeniya, no. 11, 1960, 78 - 79

TEXT: There are various types of sealings of flanged electric motor shafts driving coal mining machines, designed to prevent the leakage of lubricants from the reduction gear casing into the motor. Two new sealing types for the shafts of such electric motors have been developed at the Kopeyskiy mashinostroi-
tel'nyy zavod im. S. M. Kirova (Kopeysk Machine Works im. S. M. Kirov). The sealings are mounted on a special test stand. The first consists of a packing ring (1) in a rotating labyrinth (2), and a fixed bushing (3) encompassed by the packing ring. The work edge of the ring spreads under the action of centrifugal force when the shaft (4) rotates, thus preventing its excessive heating and wear. Pressure produced by the labyrinth prevents oil leakage. The design ensures dependable sealing and long life of the rubber packing ring. In the second type oil penetrating into the inner space of the rotating casing (1) is driven out through holes in the bucket (2) and flange (3) and a pipe (4) owing to the

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S/122/60/000/011/019/020
A161/A127

Seals for high-speed shafts

pressure being formed during rotation, and flows into a separate chamber or into the top portion of the reduction gear box. When the shaft (5) stops, it is sealed with the work edge of the packing ring (6) surrounding a rim on the fixed flange (3). The work principle of this ring is the same as that of the first sealing type. In laboratory tests the oil leakage did not exceed $0.04 \text{ cm}^3/\text{h}$ at 1500 rpm. The first sealing type is simpler and has been preferably mounted on the KPM3 (KMP3) coal cutter on both ends of the electric motor shaft. There are 2 figures.

Card 2/4

VERKLOV, B.A., inzh.; SANDLER, A.N., inzh.

Industrial testing of the PK-4 cutter loader for mining
two-track workings. Ugol.prom. no.5:53-56 8-0 '62. (MIRA 15:11)

1. Kopyeksiy mashinostroitel'nyy zavod im. Kirova.
(Coal mining machines--Testing)